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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)
)
Establishing Rules and Policies for the)
Use of Spectrum for Mobile Satellite)
Service in the Upper and Lower L-band)

IB Docket No. 96-132

To: The Commission

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COMMENTS OF LOCKHEED MARTIN CORPORATION

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SUMMARY

Lockheed Martin Corporation ("Lockheed Martin") urges the Federal Communications Commission (the "Commission") to undertake a critical reassessment of the commercial and technical objectives for MSS and make available lower L-band frequencies for competitive providers of MSS service. Contrary to the Commission's conclusion more than a decade ago, MSS systems can now operate viably with much less than 20 MHz of spectrum. Indeed, systems deploying current MSS technology can utilize small amounts of non-contiguous spectrum to deliver services comparable to, if not more useful and advanced than, those promised by American Mobile Satellite Corporation's ("AMSC") MSS system.

The Commission should not award additional spectrum to AMSC without requiring AMSC to justify why its system cannot be implemented with a much smaller allocation of spectrum. Specifically, the Commission should demand that AMSC demonstrate why it cannot deploy current technology to enhance its system's efficiency and minimize its demand for scarce spectrum resources. Moreover, the Commission should analyze whether AMSC-2 and AMSC-3 can be deployed in a manner that is more spectrally efficient than originally proposed.

Lockheed Martin supports the Commission's efforts to relieve international coordination problems that have plagued the domestic development of MSS. However, it is equally critical for the Commission to allocate L-band spectrum in a manner that reflects the current state of satellite technology, including the ability of multiple operators to coexist in the lower L-band. Establishing new L-band allocation rules that offer opportunities for others to participate in the domestic MSS marketplace would serve the public interest. Opening the domestic mobile

satellite market for competitive entry will offer consumers greater choice and result in less costly, more advanced satellite communications capabilities. Accordingly, the Commission must provide an opportunity for other MSS providers to compete with AMSC using L-band spectrum.

Finally, the Commission should permit proponents, other than AMSC, to participate in future international coordination negotiations. AMSC has little incentive in this context to press for spectrum in excess of its own needs. Moreover, other MSS providers can contribute a new perspective concerning advancements in satellite technology, spectral efficiency and other developments that cannot and will not be available based on AMSC's technology alone. Broader participation in international coordinations also will benefit the FCC's own efforts and result in far more favorable MSS allocations for the United States in the future.

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To: The Commission

COMMENTS OF LOCKHEED MARTIN CORPORATION

Lockheed Martin Corporation ("Lockheed Martin"), by its attorneys, hereby submits its comments in response to the *Notice of Proposed Rulemaking* in the above-referenced proceeding concerning licensing policies to govern mobile-satellite service ("MSS") in certain portions of the L-band.^{1/} Lockheed Martin believes the Commission should now undertake a critical assessment of commercial and technical objectives for MSS in the United States. Authorizing additional competitive licensees to provide MSS service in the U.S. market using L-band spectrum would serve the public interest, and the Commission should therefore pursue licensing and other policies that achieve this fundamental goal. The Commission also should adopt measures that will permit potential new MSS applicants to participate fully in future international coordinations of L-band spectrum. Participation by entities other than AMSC in L-band coordination efforts will help to maximize the amount of spectrum that becomes available for competing MSS systems for the United States.

^{1/} See Notice of Proposed Rulemaking in the Matter of Establishing Rules and Policies for the Use of Spectrum for Mobile Satellite Service in the Upper and Lower L-band, IB Docket No. 96-132, released June 18, 1996 ("*Notice*").

INTRODUCTION

MSS proceedings involving L-band frequencies were initiated in 1983 when the National Aeronautical and Space Administration ("NASA") requested the Commission to allocate spectrum for MSS. In 1986, following a rulemaking proceeding, the Commission allocated the 1545-1559 MHz and 1646.5-1660.5 MHz frequency bands ("upper L-band") for MSS systems.^{2/} Shortly thereafter the Commission adopted licensing policies to govern this new service.^{3/} At that time the Commission concluded that multiple domestic MSS systems were not feasible in the spectrum available in the upper L-band; that only one MSS system could be licensed for first generation use of the upper L-band; and that eligibility for the MSS license should be limited to a consortium comprising all qualified MSS applicants.^{4/}

In 1989, following the formation of American Mobile Satellite Corporation ("AMSC") by eight MSS applicants, the Commission issued a license to AMSC to construct, launch and

^{2/} Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and Establish Rules Pertaining to the Use of Radio Frequencies in Land Mobile Satellite Service, Report and Order, 2 F.C.C. Rcd. 1825, 1844 (1986) ("*LMSS Report and Order*").

^{3/} Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and Establish Rules Pertaining to the Use of Radio Frequencies in Land Mobile Satellite Service, Second Report and Order, 2 F.C.C. Rcd. 485 (1987) *rev'd in part and remanded* Aeronautical Radio, Inc. v. FCC, 928 F.2d 428 (D.C. Cir. 1991). *See also* Amendments of Parts 2, 22, and 25 of the Commission's Rules to Allocate Spectrum for and Establish Rules Pertaining to the Use of Radio Frequencies in Land Mobile Satellite Service, Final Decision on Remand ("Final Decision"), 7 F.C.C. Rcd. 266 (1992) *aff'd* Aeronautical Radio, Inc. v. FCC, 983 F.2d 275 (D.C. Cir. 1993).

^{4/} *Final Decision*, 7 F.C.C. Rcd. at 266-67.

operate a three-satellite MSS system using the 28 MHz of spectrum in the upper L-band.^{5/}

AMSC launched its first satellite, AMSC-1, on April 7, 1995. However, AMSC has not yet deployed its other two satellites, AMSC-2 and AMSC-3, but has requested numerous extensions of time to meet the construction and launch milestones established by the Commission for those satellites.^{6/}

Proceedings to allocate so-called "lower L-band" spectrum to MSS began in 1988 when Geostar Messaging Corporation requested that portions of the lower L-band be allocated for a new digital mobile-satellite service. Following a rulemaking, the Commission allocated a portion of the lower L-band (the 1530-1544 MHz and 1626.5-1645.5 MHz frequency bands) to MSS.^{7/} More recently, the Commission allocated additional lower L-band spectrum (the 1525-1530 MHz frequency band) to MSS.^{8/} Although AMSC has applied to use lower L-band frequencies for its MSS system, the Commission has never invited or permitted competing MSS proposals to use this lower L-band spectrum, nor do the Commission's proposed rules provide for the filing of new applications for these frequencies.

^{5/} Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and Establish Rules Pertaining to the Use of Radio Frequencies in Land Mobile Satellite Service, Memorandum Opinion, Order and Authorizations, 4 F.C.C. Rcd. 6041 (1989).

^{6/} AMSC-1 was assigned to orbital location 101° W.L.; AMSC-2 assigned to orbital location 62° W.L.; and AMSC-3 assigned to orbital location 139° W.L.

^{7/} Amendment of Part 2 of the Commission's Rules to Allocate Spectrum for Mobile-Satellite Services in the 1530-1544 MHz and 1626.5-1645.5 MHz Bands, First Report and Order and Further Notice of Proposed Rulemaking, 8 F.C.C. Rcd. 4246 (1993).

^{8/} Amendment of Part 2 of the Commission's Rules to Allocate Spectrum for Mobile-Satellite Services in the 1530-1544 MHz and 1626.5-1645.5 MHz Bands, Second Report and Order, 10 F.C.C. Rcd. 7305 (1995) ("*Second Lower L-band Order*").

THE COMMISSION'S PROPOSAL

By the current *Notice*, the Commission proposes to assign all coordinated L-band spectrum as follows: the first 28 MHz of spectrum (14 MHz for Earth-to-space transmissions and 14 MHz for space-to-Earth transmissions) internationally coordinated in the L-band would be assigned to AMSC; if the United States is able to coordinate more than 28 MHz of spectrum in the L-band, the Commission would allow other MSS applicants to apply for assignment of those frequencies in the future.

In support of this proposal, the Commission notes that during the course of international L-band coordinations, it became apparent that the U.S. will not be able to secure sufficient spectrum in the upper L-band for its existing licensee, AMSC.^{9/} The Commission further states that current designs of mobile terminals for MSS systems do not permit them to share frequencies in adjacent or similar geographic areas.^{10/} Given these considerations, the Commission does not believe it will be possible to secure for AMSC the 28 MHz of spectrum it authorized AMSC to use in the upper L-band.^{11/} In fact, the Commission believes it is unlikely that it will be able to coordinate more than 10 to 12 MHz of spectrum in the upper L-band.^{12/} According to the Commission's analysis:

^{9/} *Notice*, at ¶ 9. The Commission states that Inmarsat, AMSC and three other systems have claimed requirements for significantly more than the 66 MHz of L-band spectrum that is available.

^{10/} *Id.*

^{11/} *Id.*

^{12/} *Id.*

Such an amount [10 to 12 MHz] appears insufficient to operate the satellite system we authorized AMSC to build. In 1985, we estimated that an MSS system would require 20 MHz. That prediction is supported by the spectrum demands being made by the other administrations in L-band coordinations. In sum, it appears that the available 10-12 MHz will be insufficient even for the one satellite AMSC has already launched.^{13/}

In view of these factors, the *Notice* asks whether the Commission should permit AMSC to use the adjacent spectrum in the lower L-band to implement its system, or whether the Commission should open up the lower L-band for competing applications. The Commission notes that opening the lower L-band for competing applications would present at least a "theoretical possibility" for a second U.S. licensee to begin providing MSS in the L-band in competition with AMSC.^{14/} However, the Commission states that its experience in L-band coordinations since 1989 leads it to question whether this theoretical possibility is a realistic one.^{15/} The Commission believes it is unlikely it could coordinate more than 10 MHz in the lower L-band for another U.S. system, and notes it has previously estimated that 20 MHz is the minimum amount of spectrum necessary for a viable MSS system.^{16/} The Commission seeks comment on whether this estimate is still valid, or whether an economically viable MSS system can be operated in either the upper or lower L-band using a smaller amount of spectrum. The Commission urges commenters, in addressing this question, to consider the presence of Inmarsat and three other geostationary MSS systems in the lower L-band and the likelihood that

^{13/} *Id.* (footnote omitted).

^{14/} *Notice*, at ¶ 10.

^{15/} *Id.*

^{16/} *Id.*

geostationary satellites will continue to occupy this portion of the spectrum for the foreseeable future.^{17/}

Commission doubts about whether there is enough spectrum to sustain another system in the L-band have led it to propose the assignment of lower L-band spectrum to AMSC, up to the full 28 MHz for which AMSC is authorized in the upper L-band.^{18/} Specifically, the *Notice* proposes to limit eligibility for the first 14 MHz of spectrum coordinated for Earth-to-space transmissions and the first 14 MHz coordinated for space-to-Earth transmissions in the upper and/or lower L-bands to AMSC.^{19/} Under this proposal, AMSC would have first priority for use of the lower L-band spectrum only as necessary to compensate for the loss of upper L-band spectrum currently assigned to it.

Even under the current proposal, the Commission states it is "pessimistic" about coordinating all 28 MHz of spectrum. The Commission does expect, however, to coordinate enough spectrum to permit AMSC to operate at least one of its three satellites in a cost-effective way.^{20/} If contrary to its expectation, the Commission is able to coordinate more than 28 MHz of spectrum in the upper and/or lower L-bands, then it proposes to permit other parties to apply for such additional spectrum.^{21/}

^{17/} *Id.*

^{18/} *Notice*, at ¶ 11.

^{19/} *Id.*

^{20/} *Notice*, at ¶ 16.

^{21/} *Id.*

**CURRENT MSS TECHNOLOGICAL DEVELOPMENTS
REQUIRE REASSESSMENT OF THE AMOUNT OF L-BAND
SPECTRUM THAT IS NEEDED TO OPERATE A VIABLE MSS SYSTEM**

In 1985, the Commission estimated that 20 MHz is the minimum amount of spectrum necessary for a viable MSS system. The *Notice* seeks comments on whether this estimate is still valid, or whether an economically viable MSS system can be operated in either the upper or lower L-band using a smaller amount of spectrum.

Lockheed Martin submits that 20 MHz of L-band spectrum is not needed to support a viable MSS system using today's advanced satellite technology. The Commission's original analysis was performed in 1985 — more than a decade ago — and there have been tremendous strides in satellite technology in the interim. In particular, voice coding and data compression technologies, as well as modulation schemes, have advanced considerably in recent years, prompted in part by non-geostationary MSS developments. As a result of these advances, less bandwidth is required to support the same amount of communications traffic.

Lockheed Martin is particularly knowledgeable as to geostationary MSS developments because of its involvement in MSS projects around the globe. For example, Lockheed Martin is the prime contractor for the Asia Cellular Satellite ("ACeS") system, a satellite-based, hand-held, digital mobile telecommunications system that will provide service to subscribers in the Asia-Pacific region. Lockheed Martin is constructing the ACeS satellite, associated ground equipment for the ACeS system and certain long-lead components of a back-up satellite.

Lockheed Martin's development of the ACeS satellite system attests to the ability of MSS providers to utilize spectrum efficiently and illustrates dramatically that high quality service can be provided using relatively small amounts of radio spectrum. Indeed, the latest geostationary

MSS technology developments offer many advantages over older technologies, including compatibility with hand-held mobile terminals, but most importantly, very high spectral efficiency. New levels of spectral efficiency can be achieved by means of multiple spatial frequency re-use resulting from the many spot-beams (in excess of 100) covering a region. This feature, combined with the advantages derived from the use of on-board signal processing, means that such systems can effectively use relatively small segments of non-contiguous spectrum to deliver services comparable to, if not more useful than, those promised by AMSC's system.

Lockheed Martin's ACeS mobile satellite system features significantly more spectral efficiency and circuit capability than older architectures. For instance, the ACeS satellite will use 39 foot (12 meter) reflectors to form 140 closely spaced spot beams. These high gain spot beams will provide spatial isolation that allows the L-band frequencies to be re-used 20 times over the coverage area. Thus, based on frequency reuse alone, the ACeS system is twenty times more spectrally efficient than systems that do not re-use frequencies.^{22/}

^{22/} In contrast, the AMSC satellite design uses 16 by 20 foot elliptical reflectors to form four large area coverage beams over the continental United States ("CONUS"), in addition to a Southern beam to cover the Caribbean and Mexico and Western beam to cover Hawaii and Alaska. See "Development of the Hughes Springback Antenna," Prepared by Hughes Space and Communications, February 1996. AMSC's system, however, re-uses frequencies only between the extreme east and west CONUS beams, thereby requiring separate frequency assignments for three of the four beams. Moreover, in-orbit technical failures have forced AMSC to disengage the east beam and use the central beam to cover the eastern United States, restricting further its ability to re-use spectrum allocated for its MSS system's operation. See American Mobile Satellite Corporation 10K filing at 6 (For Fiscal Year Ended December 31, 1995) (Filed April 2, 1996) ("AMSC 10K").

In addition, ACeS air interface, modulation and coding scheme can support 160 voice circuits per MHz of spectrum (before frequency re-use is factored). ACeS' technical capability of 160 circuits per MHz is achieved, in part, by the implementation of state-of-the-art voice coding and compression algorithms (vocoder). These technologies are twice as efficient as current GSM voice compression algorithms, which means that far less spectrum is required to provide sophisticated, dependable MSS service. Further, in conjunction with 20 times frequency reuse, these technologies can result in call capacities that equate to 3200 simultaneous voice circuits per MHz — a call capacity that can provide a favorable return on investment on projects that demand substantial upfront outlays and lead-times.

Considering the foregoing, the Commission must reassess its earlier estimate that 20 MHz is the minimum amount of spectrum necessary for a viable MSS system. By implementing current MSS technologies, viable MSS systems can operate profitably with much less than 20 MHz of total spectrum. Indeed, 5 MHz of spectrum can now support up to 16,000 simultaneous simplex circuits, and 10 MHz of spectrum can support this number of full duplex circuits.^{23/}

Before the Commission takes the drastic step of granting AMSC access to upper and lower L-Band frequencies in their entirety, it should require AMSC to justify why it cannot implement its system with a much smaller allocation of spectrum. For instance, the Commission may request that AMSC reevaluate its spectrum needs for AMSC-1 by demonstrating in this

^{23/} Significantly, Lockheed Martin's ACeS' system also utilizes non-contiguous frequency assignments as small as 200 kHz anywhere in a 34 MHz band. As such, the ACeS system can benefit from small allocations of frequencies in distinct portions of the U.S. radio spectrum. In contrast, AMSC's system utilizes 3.5 MHz and 4.5 MHz of contiguous spectrum within a 29 MHz band. *See Request for Minor Modification*, In the Matter of the Application of AMSC Subsidiary Corporation, Attachment 3, Transponder Plan ¶ 2 (January 31, 1992).

proceeding why the company cannot utilize new ground segment technologies to enhance its efficiency and why adoption of these technologies could not minimize its demand for MSS spectrum. Several suppliers of voice compression equipment are developing vocoders that could operate at 3 kbps per voice circuit. Upgrading the vocoder software in AMSC's terminals and gateway processing equipment to benefit from these technologies could reduce by half the spectrum required for AMSC-1's operation, while maintaining the same number of users. Moreover, to the extent that AMSC-2 and AMSC-3 remain undeveloped, the FCC should determine the extent to which the remaining satellites in AMSC's proposed MSS system can be modified to reduce the system's inefficient demand for spectrum resources.

**THE PUBLIC INTEREST WILL BE SERVED BY
PROVIDING FOR COMPETITIVE
SERVICES IN THE DOMESTIC MSS MARKETPLACE**

Establishing new L-band allocation rules that offer increased opportunities for participation in the domestic MSS marketplace, rather than allocating large amounts of spectrum to a single MSS provider, will serve the public interest and, therefore, must be pursued. Indeed, opening the domestic mobile satellite market to greater competition will reinforce recent efforts of both Congress and the FCC to offer consumers greater choice among telecommunications service providers. It also will encourage efficient use of spectral resources in the near term, and in the future, as improved technologies become available to offer users increased system capacity and higher quality communications capabilities.

Historically, the Commission has favored an "open skies" policy in licensing domestic satellite systems. In fact, even in the early stages of satellite development, the Commission expressly recognized that providing for multiple entry into the domestic satellite

communications marketplace would encourage service and technical innovation, and provide an impetus for efforts to minimize costs and charges to the public.^{24/} The benefits of such a non-exclusive policy — namely, better service, lower costs and wider consumer choices — consistently have been recognized by the Commission, and must be considered in determining the extent to which AMSC will be permitted to utilize L-band spectrum for the delivery of its geostationary mobile satellite service.^{25/}

The Commission's determination in 1987 to grant AMSC an exclusive domestic MSS license was based on technologies and data that are now over a decade old. Similarly, it was almost ten years ago that the Commission found that adopting the AMSC consortium approach was consistent with the open skies policy and the Commission's pro-competitive goals. At that time, licensing multiple satellite systems was not feasible because of an insufficient amount of radio spectrum.^{26/} In today's environment, however, the Commission is no longer limited in

^{24/} See *Domestic Communications-Satellite Facilities*, 35 FCC 2d 844, 38 FCC 2d 665 (1972) (adopting "open skies" policy for satellite communications, in which multiple entries will be accepted).

^{25/} See generally *Satellite Business Systems, et al.*, Memorandum of Federal Communications Commission as Amicus Curiae, 62 FCC 2d 1102, 1111 (1975) ("in those instances where [the Commission's] policy choices have favored additional competition, it has relied not upon competition for its own sake but upon specific findings that public interest benefits — such as better service, lower costs and wider consumer choices — would result"). See generally *An Inquiry into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems*, 86 FCC 2d 469, 474 (1981) (adopting multiple licensing policy for cellular industry to foster "different technological approaches, diversity of service options and some degree of price competition which otherwise would not be present").

^{26/} See *Notice* at ¶ 20; *Second Report and Order*, 2 FCC Rcd at 486 ("authorizing multiple MSS systems to share the same spectrum is not a feasible licensing alternative *at least for the first generation* . . . the amount of spectrum available for this service warrants the licensing of one *initial* MSS system using the entire allocated spectrum") (emphasis added).

serving the public interest by such technological restrictions. As discussed above, enormous advancements in technology have made it possible for satellite systems to provide service using small amounts of non-contiguous spectrum. As such, the public interest can only be served by a reexamination of AMSC's technology and the company's ability to utilize spectrum-efficient technologies to deliver its MSS service to the public.

At the time of AMSC's licensing, it was anticipated that all three satellites comprising the AMSC system would be constructed, launched and operating by July 1994. Since that time, AMSC has requested numerous extensions of the construction and launch deadlines and has, to date, launched only one satellite.^{27/} The Commission must question a ten-year-old, partially deployed system that does not make efficient use of spectral resources. Indeed, informed Commission decision-making regarding additional satellite system frequency allocations must take into consideration current technologies and the public benefits that adoption of these technologies can bring. While Lockheed Martin supports the Commission's efforts to relieve international coordination problems that have plagued the domestic development of MSS, Lockheed Martin also believes it is equally critical for the FCC to allocate spectrum in the L-Band in a manner that reflects current technological developments, including the ability of multiple parties to operate in these MSS frequency bands.^{28/}

^{27/} AMSC-1, the first satellite constructed by AMSC was launched almost two years after its scheduled deployment. AMSC-2 and AMSC-3 have not been launched or placed in operation and have been the subject of at least six extension requests since 1991.

^{28/} As discussed previously, the mobile satellite system being developed for the Asian market utilizes significantly less spectrum and yet will offer more advanced services than those proposed by the AMSC system. The Commission's spectrum allocations for the lower L-band should recognize these advancements in order to directly encourage efficient use of scarce

New MSS systems using state-of-the-art technology are dramatically more efficient than AMSC's system and provide a higher level of satellite services, including service to hand-held mobile terminals. Lockheed Martin submits that some means must be found to enable geostationary MSS systems using current technology to provide service to the U.S. public. A failure to accommodate advanced L-band MSS systems comparable to the ACeS system in the Asia-Pacific region will mean that other nations will have much more sophisticated satellite technology, and therefore better satellite services, than is available in the United States.^{29/} Conversely, a small allocation of spectrum for such systems, *e.g.* 10 MHz, will allow them to be viable competitors. The Commission must therefore pursue all possible measures to require AMSC to use spectrum efficiently so that L-band frequencies can be allocated for competing MSS systems in the United States. The FCC should not protect a service that utilizes outdated

spectrum resources. It would be contrary to the public interest to encourage the inefficient use of MSS spectrum domestically, when international competition in the satellite marketplace is increasing at a staggering rate. The Commission must ensure that its domestic MSS service is capable of meeting future competitive challenges by establishing incentives for technological progress and efficiency.

^{29/} Moreover, limiting L-band spectrum use to AMSC may, in the long run, disadvantage the United States in its negotiation for allocations of additional international MSS spectrum. As reflected in the Memorandum of Understanding signed on June 19, 1996, spectrum allocations to individual operators (*e.g.* the U.S., Canada, Mexico, Inmarsat and the Russian Federation) will be reviewed annually on the basis of actual usage and short-term projections for future needs. Accordingly, providing for the licensing of additional, more efficient MSS systems that offer convenient and competitive wireless services will attract more subscribers and thereby enhance the U.S.'s negotiating position internationally. Implementation of the proposal presented in this *Notice*, however, likely will result in a reduction in consumer demand for domestic MSS services over time ultimately diminishing the overall U.S. MSS spectrum allocation.

technology from competitive systems that can provide better, more advanced, less costly services to the public.^{30/}

Earlier this year, Congress passed the Telecommunications Act of 1996, legislation that promises to open many telecommunications markets, including traditionally monopolized markets, to competition.^{31/} The FCC must support these efforts, consistent with its own pro-competitive policies, by ensuring that L-band spectrum is allocated in a manner that encourages competition and provides an incentive for the delivery of efficient, cost-effective, and technologically advanced MSS.^{32/} In an era where it has become feasible for numerous parties to provide competing services using distinct technologies, without commanding substantial blocks of contiguous spectrum, the public interest demands that the FCC's domestic satellite policies encourage broad participation in the marketplace and meaningful consumer choice among competing providers of MSS service. As such, Lockheed Martin urges the Commission to reexamine AMSC's spectrum needs and provide an opportunity for competitors to utilize lower

^{30/} AMSC user terminals, for example, are large, briefcase-sized or automobile mounted units that cost approximately \$2000-\$2500. *See* AMSC 10K at 10-11. Such terminals will not compete successfully with newer hand-held telephones that will operate with the new global and regional mobile satellite systems starting in 1998 and that will cost significantly less. Consequently, demand for AMSC's services will decrease significantly as consumers are drawn to the less expensive, more user-friendly, pocket-sized phones.

^{31/} *See* The Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56, *to be codified at* 47 U.S.C. §§ 151 *et seq.*

^{32/} *See e.g. Public Notice*, "FCC Proposes Expansion in Market Access For Foreign Satellite Systems; Proposed Rules Would Encourage Competition," IB Docket No. 96-111, CC Docket No. 93-23, Rep. No. DC 96-41 (released May 9, 1996) ("[T]he primary objective of the U.S. satellite policy has long been to foster the greatest possible availability of efficient and innovative satellite communications services for users in the United States. The Commission has relied on competition among multiple private entities as the surest way to achieve this goal.").

L-band spectrum on an equal basis with AMSC. Only if such steps are taken in the near term will the public interest be protected and served.

**THE FCC'S ABILITY TO NEGOTIATE IN FUTURE
INTERNATIONAL COORDINATIONS CONCERNING
L-BAND SPECTRUM WILL BE ENHANCED BY THE
PARTICIPATION OF MSS PROPONENTS OTHER THAN AMSC**

The Commission proposes to assign the first 28 MHz of spectrum internationally coordinated in the L-band to AMSC, although it remains "pessimistic" about coordinating a full 28 MHz of spectrum. If the United States is able to coordinate more than 28 MHz of spectrum in the L-band, then the Commission would allow other MSS applicants to apply for assignment of those frequencies.

Under this framework, the critical decision as to whether a competing L-band MSS system can be licensed in the United States would depend on the outcome of international coordinations. Moreover, should the Commission decline to assign lower L-band spectrum automatically to AMSC and instead open up these frequency bands for a competing MSS provider, as urged by Lockheed Martin and others, then the amount of usable L-band spectrum available for another domestic MSS system will hinge upon the success achieved by U.S. interests at future international coordination meetings. As such, all MSS proponents have a strong interest in supporting the FCC's international MSS coordination efforts. For this reason, future coordination efforts should include the full and active participation of MSS proponents, other than AMSC. Lockheed Martin, therefore, requests the opportunity to participate in L-band coordination efforts, and volunteers to make available technical experts for this purpose.

In addition, the unique circumstances presented in this case require special measures to ensure that the interests of MSS proponents other than AMSC are fully protected throughout the coordination process. First, AMSC would not be motivated during coordinations to fight for a single kHz more than it seeks for its system. Indeed, it would be highly improbable for AMSC to press for additional spectrum, for it would require AMSC to argue for spectrum for a competitor to its own MSS system. Thus, permitting AMSC to remain the sole industry spokesperson for coordinating L-band spectrum is not a plan designed to achieve spectral efficiency, maximize frequencies available for another U.S. system, or assure competition in the MSS marketplace.

Second, private satellite interests, not currently represented at the coordination meetings, would be better protected if broader participation in the negotiation process were permitted. The Commission itself has recognized that effective coordination can only be achieved through the active involvement of satellite system proponents.^{33/} Thus, the participation of MSS system proponents (other than AMSC) in international negotiations would significantly benefit the FCC's efforts and result in more favorable allocations for the United States.

Third, as noted above, AMSC's technology is outdated when compared to more advanced MSS systems such as the ACeS system being implemented in Asia by Lockheed Martin. Among other advantages, state-of-the-art MSS systems can effectively use relatively small segments of non-contiguous spectrum, which might be of no value to inefficient MSS systems such as the one deployed by AMSC. Thus, emerging MSS providers can offer current developments,

^{33/} See generally Notice at ¶ 7.

perspectives and analyses regarding the technical aspects of MSS that cannot and will not be available by reference to AMSC's technology alone. These and other considerations advocate that proponents of the latest MSS technology be represented at future international coordinations of L-band spectrum.

For these reasons, the Commission should adopt measures immediately to enable other interested MSS proponents to participate in future international L-band coordinations.

CONCLUSION

The Commission must reassess AMSC's spectrum requirements in light of current technologies and MSS capabilities and adopt lower L-band spectrum allocation policies that promote competition and spectral efficiency. The Commission also must permit MSS proponents, other than AMSC, to participate in all future international coordinations concerning L-band spectrum. Unless the Commission takes steps to develop a competitively robust

domestic MSS marketplace, through multiple licensing and enhanced participation in international coordination negotiations, the United States will trail other nations in providing competitive MSS services.

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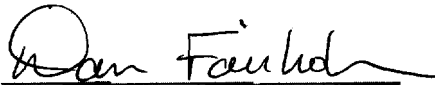
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September 17, 1996

DECLARATION

I am the technically qualified person contributing to the preparation of the foregoing Comments of Lockheed Martin Corporation. I am familiar with the technical parameters discussed therein and declare that facts contained in the Comments, except those as to which official notice may be taken, are true and correct to the best of my knowledge, information and belief.

Signed this 13 day of September 1996

A handwritten signature in dark ink, appearing to read "Dan Fairholm", written over a horizontal line.

Dan Fairholm
Manager, Systems Engineer
Lockheed Martin Telecommunications

CERTIFICATE OF SERVICE

I, V. Lynne Lyttle, a secretary at Dow, Lohnes & Albertson, do hereby certify that on this 17th day of September, 1996, copies of the foregoing "Comments of Lockheed Martin Corporation" were sent via first class mail, postage pre-paid, to the following:

*The Honorable Reed E. Hundt
Chairman
Federal Communications Commission
1919 M Street, NW, Room 814
Washington, DC 20554

*The Honorable James H. Quello
Commissioner
Federal Communications Commission
1919 M Street, NW, Room 802
Washington, DC 20554

*The Honorable Susan Ness
Commissioner
Federal Communications Commission
1919 M Street, NW, Room 832
Washington, DC 20554

*The Honorable Rachelle B. Chong
Commissioner
Federal Communications Commission
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*Mr. Donald H. Gips, Chief
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*Ms. Cecily C. Holiday, Deputy Chief
Satellite and Radiocommunications Division
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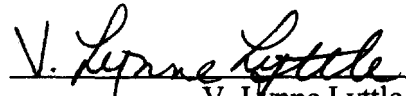
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* Indicates Hand Delivery.